REMARKS

Claims 7, 8, and 10 to 12, appear in this application for the Examiner's review and consideration. The claims are fully supported by the specification and claims as originally filed. Therefore, there is no issue of new matter.

Claims 7, 8, and 10 to 12 stand rejected under 35 U.S.C. § 103(a), as allegedly being unpatentable over Japanese Application Publication No. JP 10-176239 to Kashima et al. (Kashima), for the reasons set forth on pages 2 to 4 of the Office Action; and

Claims 7, 8, and 10 to 12 stand rejected under 35 U.S.C. § 103(a), as allegedly being unpatentable over Japanese Application Publication No. 2003-096545 to Kami et al. (Kami), for the reasons set forth on pages 4 to 6 of the Office Action.

In response, Applicants submit that the presently claimed invention is directed to a steel pipe formed from a plate of a steel base material. The steel base material comprises, by mass %, C: 0.03 to 0.30%, Si: 0.01 to 0.8%, Mn: 0.3 to 2.5%, P: 0.03% or less, S: 0.01% or less, Al: 0.001 to 0.1%, N: 0.01% or less, and a balance of iron and unavoidable impurities. A steel pipe, formed from a plate of the steel base material, and heated at the austenite-ferrite dual-phase temperature region and then quenched, where the heating and quenching are after the plate of the steel base material is shaped into the pipe, has a dual-phase structure substantially comprising a ferrite structure and fine martensite dispersed at the ferrite grain boundaries, and has a ratio of the proportional limit of the compression stress-strain curve in the circumferential direction before and after expansion of at least 0.7.

Thus, the claims have been amended to clarify that it is the steel pipe, after heating to the austenite-ferrite dual-phase temperature region and then quenched, that has the presently claimed ferrite structure and fine martensite dispersed at the ferrite grain boundaries.

With regard to Kashima, the Final Office Action states:

> The steel also comprises a two-phase (dual-phase) microstructure essentially consisting of 1-20 area percent martensite and the remainder ferrite (abstract; paragraph [0024]). Because the dual-phase structure essentially consists of martensite and ferrite, the two phases are adjacent to one another, thus satisfying the grain boundary configuration as claimed. The average size of the martensite grains is less than 10 μm (paragraph [0025]), which overlaps the claimed range. The steel sheet is formed into a pipe, and the small decrease in the yield strength of the steel after it has been formed into a pipe signifies a reduced Bauschinger effect (abstract; paragraphs [0005], [0025], [0035], [0036]; Tables 2 and 3, ΔYS column).

In response to that rejection, Applicants submit that the Final Office Action is correct in that the steel plate that Kashima discloses has a dual-phase structure that essentially consists of martensite and ferrite. However, Kashima only discloses that the steel plate has the presently claimed dual-phase structure. Kashima does not disclose or suggest a steel pipe having a dual-phase martensite/ferrite structure, as presently claimed. One of ordinary skill in the art will understand that the pipe disclosed by Kashima does not have the presently claimed dual-phase martensite/ferrite structure.

In contrast to the pipe disclosed by Kashima, the presently claimed steel pipe is formed from a steel plate that is shaped into the pipe, where, after being formed into a pipe, the pipe is heat treated and quenched. It is the heating and quenching after the steel plate is shaped into the pipe that provides the dual-phase microstructure of the pipe, comprising a ferrite and fine martensite, where the fine martensite is present dispersed in the ferrite structure, as illustrated in Figure 4(b) of the present specification.

Contrary to the statement in the Final Office Action that the adjacent phases of martensite and ferrite disclosed by Kashima satisfies the recitation of fine martensite dispersed at the ferrite grain boundaries in the present claims, one of ordinary skill in the art will understand that a martensite phase that is adjacent to a ferrite phase is clearly not dispersed in the ferrite phase, as presently claimed.

In addition, as stated in the Rule 132 Declaration of Dr. Asahi submitted with the Amendment dated June 17, 2011, Kashima does not disclose or suggest that the pipe is heat treated and quenched. Those skilled in the art will clearly understand Kashima discloses a pipe formed from a steel plate produced by the Thermo Mechanical Control Process (TMCP). Those skilled in the art will also understand that a steel pipe formed using TMCP, as disclosed by Kashima, is not heat and quenched, as presently claimed.

Therefore, Kashima does not disclose or suggest a steel pipe having the presently claimed dual-phase microstructure, or that the pipe disclosed by that reference has a ratio of the proportional limit of the compression stress-strain curve in the circumferential direction before and after expansion of at 0.7, and fails to provide any reason for one of ordinary skill in the art to make and/or use the presently claimed steel pipe.

With regard to Kami, the Final Office Action states that Kami discloses a steel pipe formed from a steel having a composition that overlaps the steel composition recited in the present claims, where the pipe is formed in a process that is substantially the same as the process used to form the presently claimed steel pipe.

However, in paragraph [0013], Kami discloses that after heating the steel tube to a temperature in the range of 650° to 850°C, the tube undergoes a 50 percent reduction rolling. The tube was then cooled to 600°C at an average cooling rate of 2.0°C/second. Thus, the tube, i.e., pipe disclosed by Kami was hot rolled and cooled, but not quenched. In paragraph [0014], Kami discloses that that treatment resulted in tube having a lamellar structure of martensite and a ferrite.

Those skilled in the art will understand that that the a lamellar structure of martensite and ferrite is a mutually layered structure of separate layers of martensite and ferrite structures. Such a lamellar structure is not the microstructure of fine martensite dispersed in ferrite at the ferrite grain boundaries, as illustrated in Figure 4, and recited in the present claims.

As the tube, i.e., pipe, disclosed by Kami is not heat treated and then quenched, but, instead, hot rolled and cooled at 2.0°C/second, the resulting lamellar microstructure of martensite and ferrite is obtained instead of the presently claimed microstructure of fine martensite dispersed in ferrite, where fine martensite is dispersed at the ferrite grain boundaries. As stated in the Rule 132 Declaration of Dr. Asahi, a cooling rate of 2°/second is not quenching. The term "quenching" is a term of art, and requires cooling at a rate significantly faster than 2°/second. As stated by Dr. Asahi in his Rule 132 Declaration, one of ordinary skill in the art will understand that a typical average cooling rate for quenching is typically 30°C/second, and a minimum cooling rate for quenching is about 10°C/second. Cooling at 2°C/second is not quenching.

Again, the presently claimed steel pipe is formed from a steel plate that is shaped into the steel pipe, where, after the steel pipe is formed from the steel plate, the steel pipe is heat treated and then quenched. It is the heat treatment and quenching of the steel pipe, after the steel pipe formed from the steel plate, that results in a steel pipe having a dual-phase microstructure comprising ferrite and fine martensite, where the fine martensite is dispersed in the ferrite structure, as illustrated in Figure 4(b) and presently claimed.

Kami does not disclose or suggest the presently claimed steel pipe, and fails to provide any reason for one of ordinary skill in the art to make and/or use the steel pipe of the invention.

Thus, neither of the cited references discloses or suggests a steel pipe having a microstructure of fine martensite dispersed in ferrite, as presently claimed.

As Kashima and Kami, whether taken alone or in combination, fail to disclose or suggest the presently claimed steel pipe, and fail provide any reason for one of ordinary skill

in the art to make and/or use the steel pipe of the invention, the present claims are not obvious over those references. Accordingly, it is respectfully requested that the Examiner withdraw the rejections of claims 7, 8, and 10 to 12 under 35 U.S.C. § 103(a) over Kashima and Kami.

Applicants thus submit that the entire application is now in condition for allowance, an early notice of which would be appreciated. Should the Examiner not agree with Applicants' position, a personal or telephonic interview is respectfully requested to discuss any remaining issues prior to the issuance of a further Office Action, and to expedite the allowance of the application.

No fee is believed to be due for the filing of this Amendment. Should any fees be due, however, please charge such fees to Deposit Account No. 11-0600.

Respectfully submitted,

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